

APPENDIX B

Request for Information

(including Functional and Technical System Requirements)



STATE OF TENNESSEE
Department of Finance and Administration
Office for Information Resources

REQUEST FOR INFORMATION
FOR
STATEWIDE ENTERPRISE RESOURCE
PLANNING SOFTWARE AND ASSOCIATED
IMPLEMENTATION SERVICES

RFI Number: 317.03-093

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REQUEST FOR INFORMATION BY THE STATE OF TENNESSEE OFFICE FOR INFORMATION RESOURCES

A STATEMENT OF INTENT:

The State of Tennessee (State), Office for Information Resources (OIR), issues this Request for Information (RFI) for the purpose of obtaining information to help State leadership ascertain whether it is in the State's best interests to implement a new Enterprise Resource Planning (ERP) system that will be used by State agencies to address financial management, budget development, human resources, payroll, benefits administration, procurement, fleet management, and other associated administrative business process needs.

The purpose of the RFI is to obtain information from prospective ERP vendors that can assist the State in determining:

1. The degree to which commercially-available ERP systems meet the State's administrative business requirements;
2. The estimated licensing and annual maintenance costs, including the cost of upgrades, for the ERP software; and
3. The estimated costs of implementing the ERP solution in a statewide environment, using a phased approach.

Prospective vendors are strongly encouraged to respond to this RFI. The information received in response to this RFI will help determine the future direction of any future Request for Proposal (RFP) for ERP software and implementation services. Respondent information will also be used to document the business case and funding requirements for a potential statewide ERP system. Your input is greatly appreciated.

B BACKGROUND:

B.1 Introduction

In the State of Tennessee's Information Systems Planning process, agencies describe their strategic business plans and how technology will be used to implement solutions and solve business problems. Each agency presents a technology plan for three fiscal years. During the last several planning cycles, a number of administrative agencies described the need for major systems replacements. What made these replacements unique was that the systems under discussion impact every agency and commission within state government. The core business systems that support Tennessee's infrastructure continue to age and the agencies that are responsible for these business areas are planning for system replacements.

Each of these core business systems is interrelated to many business processes. If one system is changed or replaced, there can be a dramatic impact on other business processes and the supporting systems. Examples include the following:

- If the current payroll systems were to be replaced, a number of changes would also be required to personnel and accounting systems. The reverse is also true: if the personnel system were replaced, modifications would be required to the payroll and accounting systems.
- The current personnel system is composed of multiple internal components. If one of these internal systems is replaced, many changes would be required in the Computerized Employment Testing, Applicant Certification System, Training Information System, and/or the Employment Application Imaging System
- If a new accounting system were introduced, changes would be required to the payroll, benefits, and revenue systems. In addition, modifications would be required for interfaces between the central accounting system and agency-unique systems. These core business systems touch all departments from both a systems perspective and a business process perspective.

The agencies responsible for the core business functions form a close working relationship in order to provide the necessary services to support the State. Payroll, under the Department of F&A, and personnel functions, under the Department of Personnel, have a partnership dedicated to providing cost-effective and accurate payroll functions. Purchasing, under the Department of General Services, provides central purchasing services for all of state government. Purchasing is closely linked to the accounting processes administered through the Department of F&A. These are only a few of the examples of the business relationships that are important to the effective management of the core business functions.

As the business needs of the State drives the need for automation, the business partnerships should also be reflected in the choice of automation solutions. In the case of the core or central business areas, agencies are interdependent and should work together in the selection, purchase and implementation of software systems since these agencies rely upon one another for effective operation of their respective areas. These core agencies have found that a common strategic direction should be created that reflects the need to form an integrated systems solution for those business areas with strong co-dependencies.

In early 2002, a working group of business stakeholders was formed to discuss the possibilities of replacing core business systems within the State. This group is composed of the major stakeholders of the central business functions of the State as follows:

- Department of Personnel,
- Department of F&A, Division of Accounts,
- Department of F&A, Office of Budget and Finance,
- Department of F&A, Insurance Administration,
- Comptroller of the Treasury,
- Department of the Treasury,
- Department of General Services,
- Department of F&A, Office for Information Resources,
- Department of Human Services,

- Department of Children's Services
- Department of Correction,
- Department of Health,
- Department of Labor and Work Force Development, and
- Department of Transportation.

Enterprise Resource Planning (ERP) is seen as a possible solution for replacing the State's aging legacy systems with an enterprise-wide solution that would be integrated, utilize best business practices, reinforce current business partnerships, and offer a much needed enhancement to the level of services offered by core business areas. The business partnership was formalized and became known as the ERP Work Group.

One of the first major tasks undertaken by the ERP Work Group was to initiate an ERP Automation Assessment Study. The purpose of this study is to determine whether implementing a statewide ERP system is a viable solution for the State of Tennessee. A consulting firm was engaged in August 2002 to conduct the study with an anticipated completion date of February 2003. Major project deliverables include:

- Documentation of the State's major "As Is" business processes, potential process improvement opportunities, and potential changes that will be required to achieve the improvement opportunities;
- Preparation of an interface model that identifies interfacing requirements between the potential ERP system and statewide legacy business systems that will continue to operate and must be interfaced to the new system;
- Identification of laws, regulations and policies that may require changes in order to effectively implement a new ERP system;
- Development of "To Be" functional and technical requirements based on best business practices;
- Comparative analysis of the ERP software's ability to meet the State's functional and technical system requirements;
- Development of the business case justification and cost/benefit analysis to support a new ERP system; and
- Recommendation of a strategy for acquiring ERP software along with associated consulting services required to implement the software (should the business case for an ERP system be justified).

Information collected from prospective vendors in response to this RFI will be used to develop and support the comparative analysis of ERP software's ability to meet the State's functional and technical system requirements, the business case justification, and the cost/benefit analysis activities.

B.2 Participating Core Agencies

B.2.1 Comptroller of the Treasury

The Comptroller of the Treasury is a constitutional officer elected by the General Assembly for a term of two years. Statutes prescribe the comptroller's duties, the most important of

which relate to audit of state and local government entities and participation in the general financial and administrative management of state government.

B.2.2 Department of Finance & Administration

The Department of Finance & Administration (F&A) provides critical financial and administrative support functions for the State. The governor's proposed budget for state government is developed with the oversight of the commissioner, the governor's chief financial officer. The Department manages centralized accounting, budgeting and financial reporting. The Department is also responsible for statewide information systems management, capital project management, real property management, employee insurance administration, and resource development and support.

B.2.3 Department of Personnel

With approximately 46,000 employees, state government is the largest single employer in Tennessee. In helping to ensure the effective and efficient management of those employees, the Department of Personnel provides various services, including advising the governor on personnel policies, assisting operating departments and agencies in carrying out personnel practices and complying with state and federal law, administering provisions of the Civil Service Act, administering the State's classification and compensation structure, providing departments and agencies with a pool of qualified applicants for selection for employment, and developing a career oriented work force through effective management, training and communication.

B.2.4 Department of General Services

The Department of General Services provides a broad range of support services to other departments and agencies of state government. Those services include central procurement of equipment and commodities, building management, motor vehicle and equipment management, surplus property utilization, printing and photographic services, postal services, food services, records management and central stores.

B.2.5 State Treasurer

The State Treasurer is accountable for the receipt and disbursement of public funds, investing available cash balances, administering the Tennessee Consolidated Retirement System, investing the pension fund, operating the state's Unclaimed Property Program, administering the State Employee's Deferred Compensation Program, operating the State Employees' Flexible Benefits Plan, and directing the staff of the Division of Claims Administration and the Risk Management Division.

Additional information on each of the core agencies can be found at <http://www.tennesseeanytime.org/main/government/index.html>.

B.3 Current Statewide Administrative Systems

This section provides a description of current automated systems in use by the core agencies:

B.3.1 Accounting Reconciliation Package

The Department of the Treasury reconciles disbursements, such as state warrants or payroll payments (most are ACH), using the Accounting Reconciliation Package (ARP). All issued items are presented to the Treasury and posted to the outstanding items file; the paid items are received electronically from the Nashville Federal Reserve Bank Office and

matched to the outstanding items daily. The following day the paid item images are made available to Treasury via CD-ROM. The ARP is maintained by the Department of the Treasury. There are approximately 500 end users of this system.

B.3.2 Applicant/Certification System

The Applicant/Certification System maintains records of all applications for state employment and produces civil service registers online. Personnel officers in all departments within the State of Tennessee's Executive Branch use the system. There are approximately 850 end users of the system. It is maintained by the Department of Personnel.

B.3.3 Budget Request and Analysis Systems

The Budget Request (BR) and Budget Analysis (BA) systems are the core budgetary systems maintained by the Division of Budget within F&A. BR is an Accent-based System is used in preparation of the individual agency budget requests. The Division of Budget uses BA in the analysis of all budgets.

B.3.4 Computerized Employment Testing

The Computerized Employment Testing System is maintained by the Department of Personnel. The system provides functionality to support the registration and computerized testing of applicants for state jobs. There are approximately 53 end users of the system.

B.3.5 Consolidated Retirement Information System (CRIS)

CRIS is the primary system used by the State Treasurer to administer the State's retirement plans. Functionality provided by the system includes:

- Maintenance of retiree and beneficiary statistical, benefit, and payroll information;
- Benefit estimates for employees nearing retirement;
- Main, Supplemental, Reissue, and Void payroll processes;
- Automated interface to the Microfilm Document Control System (MODOC) and Tennessee Retirement Accounting Control System (TRACS) systems; and
- Mass change processes for insurance, withholding, cost-of-living, and other deduction updates.

There are approximately 110 end users of the system. In addition to Treasury Department access, the following additional agencies have access to CRIS:

- F & A (Insurance)
- F & A (State Audit)
- University of Tennessee
- Memphis City Schools
- University of Memphis
- City of Kingsport
- Metro Schools

It should be noted that retirement plan administrative functionality will not be included in the scope of a possible new ERP system. Therefore, CRIS will not be replaced by the new ERP functionality; instead interfaces must be developed between CRIS and the new ERP system.

B.3.6 Data Capture

The Data Capture System (DCS) is a time-capture system designed to capture and edit Time and Attendance (TAA) and Labor Distribution (LD) information for employees of the State of Tennessee. DCS eliminates duplicate data entry of time for payroll and labor distribution into separate systems. It satisfies the need for a single point of data entry during the pay period. This single point of entry of time maintains the integrity of the data processed and allows the SEIS (Shared Employee Information System) Payroll and STARS Labor Distribution Subsystems to remain in balance because they both receive information from a single source. The DCS Approval feature provides a control mechanism through which timesheet monitoring and review can be performed, and requires approval by a properly authorized approver in order for an employee to be paid.

B.3.7 Deferred Compensation

The Deferred Compensation System captures and maintains a record of all contributions made by state employees to the 401(k) plan and the 457 plan. An outside contractor administers the Deferred Compensation plans. The Deferred Compensation System receives transaction data from the State's payroll system (SEIS), accumulates the payroll data on tape, and provides reports on both a pay-period and year-to-date basis. The Deferred Compensation System is maintained by the Treasury Department.

It should be noted that deferred compensation plan administrative functionality will not be included in the scope of a possible new ERP system. Therefore, the Deferred Compensation System will not be replaced by the new ERP functionality; instead interfaces must be developed between the Deferred Compensation System and the new ERP system.

B.3.8 Employment Application Imaging System

The Employment Application Imaging System is maintained by the Department of Personnel. It provides employment application processing. The system stores the image of every job application, separated employer folders, and Position Classification Questionnaires (which are used to define job responsibilities for state positions). The system utilizes workflow software to route application images throughout the Department for processing, and allows remote access to agencies to view and print applications for employment through a FileNET browser.

Personnel officers in all departments within the State of Tennessee's Executive Branch use the system. There are approximately 80 end users of the system.

B.3.9 Flexible Benefits (FLEX)

The FLEX system is maintained by the Treasury Department to support the administration of flexible benefits. Flexible benefits allow employees to set aside pre-tax dollars to make payments for insurance payments, out-of-pocket medical expenses, and dependent care expenses, thus saving employees federal income taxes and social security taxes. FLEX provides the following functionality:

- Posts contributions to participant accounts;
- Issues payments through STARS system (see description below);
- Provides the ability to maintain multiple plan years;
- Maintains enrollment data and plan year elections;
- Interfaces with the State's payroll system (SEIS); and
- Records benefit claims.

There are approximately 23 end users of FLEX.

B.3.10 Multitrak

Multitrak is a mainframe system that tracks every Request for Service (RFS) and records labor and other costs incurred while processing those requests. The system collects leave and attendance information for OIR employees that feed into the Data Capture system. Labor Hours attributable per Request for Service are billed back to the agencies and interfaced with the Billing System. Multitrak generates billing information for the Information Technology Professional Services Contract (IT Pro). Multitrak reports are used as a management tool to track the status of a Request for Service. The system is maintained by the Department of Finance and Administration. As of November 2002, there were 1,500 users of the Multitrak system.

B.3.11 State Employee Information System (SEIS)

SEIS is maintained by the Department of Personnel. The system is used to administer employee personnel and position records and to collect time and attendance information and generate payroll checks for most state employees. Personnel officers and payroll personnel in all departments within the State of Tennessee's Executive Branch use the system. Some State departments outside of the Executive Branch also have access to SEIS. There are approximately 697 personnel end users and 410 payroll end users. The acronym SEIS/CZAI is used to reference the payroll module of the system. SEIS provides the following functionality:

- Authorization of positions and recording of job classifications;
- Relating position to an individual, when a person is hired;
- Receipt of time and attendance information from Data Capture System;
- Collection and maintenance of history for employee payroll data, such as salary, payroll frequency, and payroll deductions (i.e., savings bonds, insurance plan); and
- Calculation and generation of payroll transactions.

B.3.12 Property of the State of Tennessee System Asset Management System (POST)

POST is maintained by the Department of General Services. The Property Services Management Division of the department of General Services is responsible for administration of the State's interest in various property, equipment, and supplies. This system is used to track the inventory of Tennessee's personal property.

B.3.13 Statewide Accounting and Reporting System (STARS)

STARS functions as the State's financial system of record and is maintained by the F&A Division of Accounts. It supports appropriations, allotments, encumbrances, contract, requisitions, accounts receivable/revenue accounting, accounts payable, federal grants, capital projects and general ledger and subsidiary ledger balances. In addition to transaction processing, it includes cash management, financial reporting, pre-audit capabilities, warrant consolidation by vendor, and transaction history.

Data enters STARS through one of two ways: (1) the on-line Financial Data Entry Subsystem or (2) in the case of automated system interface data, through the batch processing input phase of the Input/edit/Update (IEU) Subsystem.

Accounting staff in most State agencies uses the system. There are approximately 1,675 end users of the system.

B.3.14 Tennessee Employment Application Monitoring System (TEAMS)

TEAMS is maintained by the Department of Personnel. It provides information about state jobs, and allows applicants to apply for certain jobs and to register to take an on-site computer administered test. There are approximately 2 end users of TEAMS within the Department of Personnel; however, the system is available to the public at 9 Labor & Workforce Development offices across the State.

B.3.15 Tennessee Insurance System (TIS)

The F&A Division of Insurance Administration (DIA) serves State, Local Education, and Local Government employees by managing their state-sponsored insurance benefits. The primary purpose of TIS is to manage and report timely and accurate information for all programs in a cost efficient manner. Functionality provided includes:

- Administration of controls and regulations for program eligibility and enrollment;
- Standardization of operating and reporting requirements for all institutions;
- Identification of the insurance vendors;
- Reporting of financial information by individual, group, plan, program, budget (institution), employee, calendar year, and fiscal year;
- Tracking plan movement of participants;
- Transmittal of enrollment information to insurance vendor;
- Processing of accurate headcount for administrative services fee;
- Calculation and administration of premiums due and paid by participants;
- Providing insurance officers with current and accurate employee benefit information so they can respond to employee inquiries;
- Capture and maintenance of dependent data;
- Maintenance of insurance programs;
- Control and management of eligibility for state sponsored programs;
- Providing employees with benefit notifications indicating program status;
- Control of state funds; and

- Control of insurance programs' accounting requirements.

Approximately 380,000 individuals receive coverage through the State, Local Education and Local Government Plans. There are approximately 784 end users of TIS, including 39 staff in the Division of Insurance Administration central office, and 745 in an estimated 250 field offices (25 local government agencies, 95 local education agencies, and 130 state agencies).

The insurance system supports various types of benefit plans, including, but not limited to the following:

- Deferred Compensation (401k, 457)
- Unemployment Insurance
- Medical
- Life/accident Insurance
- Dental
- Flexible spending accounts
- Optional life/accident insurance
- Long term disability
- Short term disability
- Savings Bond
- Retirement
- Long term care
- Other - (Employee Assistance Program)

B.3.16 Tennessee Online Purchasing System (TOPS)

TOPS is administered by the Department of General Services. Major TOPS functions include:

- Maintenance and inquiry of basic purchasing information pertaining to installation tables, vendors, commodities, agencies and text;
- Processing of requisitions, solicitations, purchase orders and contract purchases;
- Automated interfaces to STARS to validate tables for editing accounting distribution data; and
- Nightly batch processing interface to STARS to encumber funds for purchases. STARS returns transactions to indicate whether the transactions passed or failed accounting processing. The results from the accounting transactions are posted to the TOPS databases by means of status codes, which allow or prevent orders from being printed.

There are approximately 2,300 TOPS users.

B.3.17 Tennessee Retirement Accounting Control System (TRACS)

TRACS is maintained by the Treasury Department. TRACS is used to support the administration of State retirement plans. Major functionality provided includes:

- Maintenance of TCRS member statistical, retirement (salary, service, and contribution), and beneficiary information;
- Update of member pay-period retirement information (salary, service, and contributions);
- Generation of member annual statements;
- Maintenance of TCRS covered employers' statistical, department/retirement data, and accounting information;
- Update of employer's accounting information (employee and employer contributions, benefits paid, interest income, and administrative expense, death benefits paid, and salaries);
- Generation of employer annual statements;
- Automated interface to the Microfilm Document Control System, CRIS, and STARS; and
- TRACS General Ledger (GL) acts as a subsidiary ledger to STARS.

There are approximately 122 end users of TRACS (including 7 TCRS employers). Other non-Treasury end users of TRACS include:

- University of Tennessee
- Memphis City Schools
- City of Kingsport
- University of Memphis
- Metro Schools
- State Audit
- Personnel

It should be noted that retirement plan administrative functionality will not be included in the scope of a possible new ERP system. Therefore, TRACS will not be replaced by the new ERP functionality; instead interfaces must be developed between TRACS and the new ERP system.

B.3.18 Training Information System

The Training Information System is maintained by the Department of Personnel. The system is used to maintain training records for all state employees. Personnel officers in various departments within the State of Tennessee's Executive Branch use the system. There are approximately 360 end users of the system.

B.4 Application Volumes

Category	Current Count
General Ledger	
Agencies	60
Funds	33
General Ledger Accounts	198
Federal Grants	300
Journal Entries Per Month (no IATs) *	1.6 million sequences (line items)
Journal Vouchers Per Month (IATs)*	325,000 sequences (line items)
Accounts Payable	
Invoices Processed	3 million sequences (line items)
Payments Processed Per Year (including warrants, EFTs, wires, and ACH)	Credit ACH – 1.3 million sequences Warrants – 1.8 million sequences Wire – 600 sequences Debit ACH – 30,000 sequences
Total Vendors Per Accounting System (STARS)	133,892
1099s Per Year	30,000
Asset Management	
Number of Controlled Assets	159,000
Number of commodity item codes	55,000

* **IAT**: inter-agency transaction

Category	Current Count
Payroll/Personnel	
Employees (includes part-time)	46,000
Payroll Warrants/Deposit Advices (paid through SEIS)	46,000 per cycle
Budgeted Positions	49,000
Job Classifications	2,600
Applications Processed	50,000
Insurance Participants	380,000
Purchasing	
Purchase Requisitions	2,500/year
Purchase Orders Issued Per year)	225,000/year
Registered Vendors Per Purchasing System (TOPS)	60,000 active 70,000 total
State Commodity Contracts and non-professional services	1,934
Professional Services Contracts & Other	8,040 active
Professional Services contracts renewed, new, or amended	3,800/year
Professional Services & Other Fiscal Year 2001/2002	\$2.1 Billion
TOPS Spend Fiscal Year 2001/2002	\$275 Million

C GENERAL INSTRUCTIONS:

The State is requesting the following information from all interested parties:

C.1.1 Functional and Technical Requirements Matrices

Complete the Functional Requirements Matrix (see Appendix A) and Technical Requirements Matrix (see Appendix B) in accordance with Section D Instructions for Responding;

C.1.2 Estimated Cost Schedule

Complete the Estimated Costs Schedule (see Appendix C) in accordance with Section D.5.5; and

C.1.3 High Level Staffing Plan

Complete the High Level Staffing Plan (see Section D.6) in accordance with Section D. Instructions for Responding; and

C.1.4 Essay Questions

Answer Essay Questions identified in Section D.6.2.

C.2 RFI ID Number

The State has assigned the following RFI identification number that must be referenced in all communications regarding the RFI:

RFI-317.03-093

C.3 State Point of Contact

The RFI Coordinator for this RFI will be Velvet Hunter. Contact information for Ms. Hunter follows:

Ms. Velvet Hunter
RFI Coordinator
State of Tennessee, Department Of Finance & Administration
Office for Information Resources
312 Eighth Avenue North
Suite 1600, Tennessee Tower
Nashville, TN 37243-0288
Telephone: (615) 741-9664
Fax: (615) 532-0471
Email: velvet.hunter@state.tn.us

C.4 Vendor Communications

All vendor communications concerning this RFI should be in writing and must be directed to the RFI Coordinator.

C.4.1 Electronic Download

This entire RFI shall be available for downloading electronically at the Office for Information Resources website:

<http://www.state.tn.us/finance/oir/erp/index.html>

C.5 State Not Responsible for Costs

The State of Tennessee shall not be responsible or liable for any costs incurred by any respondent in the preparation and submission of its RFI response or for other costs incurred by participating in this process. Furthermore, there is no guarantee that a procurement of ERP software and/or implementation services will ever take place as a result of this RFI.

C.6 RFI Responses Property of the State

All responses submitted in response to this RFI become the property of the State of Tennessee. The responses shall be open for review by the public in accordance with *Tennessee Code Annotated*, Section 10-7-504(a)(7). By submitting a response, the respondent acknowledges and accepts that the full contents of the response and associated documents shall become open to public inspection.

C.7 Minimum Qualifications

The State requires that **all** respondents to this RFI meet a set of minimum requirements as follows:

- Respondent must be a provider of ERP or comparable integrated administrative software applications. Software integrators that do not offer their own ERP software applications should not respond to this RFI.
- Respondent must have at least one public sector customer in production that can be used as a reference. This customer must have an annual operating budget equal to or exceeding \$1.5 billion and/or 46,000 employees.

C.8 Disqualification Point

A response shall be disqualified and rejected by the State if the costs in the response were not arrived at independently without collusion, consultation, communication, or agreement as to any matter relating to such costs with any other respondent, a State employee, or any competitor.

D INSTRUCTIONS FOR RESPONDING

D.1 Submission Address

Vendors that meet the minimum requirements outlined in Section C.7 are invited to submit a response to the RFI to:

Velvet Hunter
State Of Tennessee, Department Of Finance & Administration
Office for Information Resources
312 Eighth Avenue North
Suite 1600, Tennessee Tower
Nashville, TN 37243-0288

D.2 RFI Number

Please reference Request for Information #317.03-093 with your response to this request.

D.3 Submission Date and Time

Vendor responses must be received at the location identified in D.1 on or before 4:00 p.m. CST on January 6, 2003. Responses may be mailed or hand-delivered, but the respondent is responsible for ensuring timely delivery regardless of transmittal means. Responses submitted by email, facsimile transmission, or any other forms of electronic submission are not allowed.

D.4 Submission Standards

Responses to this RFI must comply with the following standards:

- Respondents must submit a signed original unbound copy of their response.
- The signed original must be clearly labeled "Original" on the front cover.
- Respondents must submit one (1) electronic copy of their response on read-only CD-ROM. Electronic copies must be formatted using Microsoft Word™ 97, or higher, and Microsoft Excel™ 97, or higher, software.
- Pages should be numbered clearly and consecutively. Respondent name and response due date must be included on each page in the header or footer.
- Vendor responses should be submitted in a sealed package. As stated in D.2, all packages containing a vendor's response must clearly reference Request for Information # 317.03-093.

D.5 Submission Instructions

In order to facilitate the analysis of responses to this RFI, responses should be submitted in accordance with the instructions outlined in this section as follows:

D.5.1 Title Page or Cover

The title page or cover must include:

"Response to Request for Information # 317.03-093"

"Statewide Enterprise Resource Planning Software & Associated Implementation Services"

"Due Date: January 6, 2003 at 4 pm CST"

Respondent Name and Address

D.5.2 Transmittal Letter

The response must provide a written transmittal and offer of the response in the form of a standard business letter. The transmittal letter shall reference and respond to the following subsections:

- The letter shall be signed by a company officer empowered to represent the respondent.
- The letter shall provide the legal entity name of the respondent.
- The letter shall provide the name, mailing address, telephone number, and email address of the respondent's contact person.
- The letter shall provide confirmation that the respondent meets the minimum qualifications as set forth in Section C.7.

A transmittal letter is mandatory. Failure to provide the information as required may result in the response being considered non-responsive and rejected.

D.5.3 Table of Contents

Each response shall be submitted with a table of contents that clearly identifies and denotes the location of each section and sub-section of the response. Additionally, the table of contents should clearly identify and denote the location of all enclosures and attachments to the response.

D.5.4 Respond to Functional and Technical Requirements

Responses to the Functional Requirements Matrix in Appendix A and the Technical Requirements Matrix in Appendix B of this RFI shall be provided in this section of the vendor's response. Respondents shall use the format provided and add explanatory details as necessary. If additional space is required, additional spreadsheets may be used but the requirement number must be referenced on the supplemental spreadsheet(s). The following coding key shall be used when responding to the requirements:

S – Standard Functionality	The ERP software provides the requested functionality without screen, code, or design changes. The product can satisfy the specification <u>"out-of-the-box"</u> without any modification to the standard baseline software offering. Only use "S" if the software fully meets the requirement.
M – Modification Required	<p>Screen, code, or design modifications must be made to the standard offering (ERP or Third party package) to satisfy the specified requirement.</p> <p>A brief explanation is required to support any proposed modification; explanations should be provided in the "Comments" section of the matrix.</p> <p>The "Cost to Modify" section must be completed for each proposed modification (including design, coding, testing, installation, and all other costs associated with the modification).</p> <p>The "Hours to Modify" section must be completed for each proposed modification (including design, coding, testing, and installation).</p> <p>An assessment of the impact of the modifications on future system upgrades must be provided in the "Upgrade Impact" section. Acceptable values are:</p> <ul style="list-style-type: none"> 0 No impact on future upgrades 1 Estimated cost of making the modification function with the upgraded software equals approximately 25% or less of the original estimated modification cost. 2 Estimated cost of making the modification function with the upgraded software equals approximately greater than 25% and less than 50% of the original estimated modification cost. 3 Estimated cost of making the modification function with the upgraded software equals approximately greater than 51% and less than 75% of the original estimated modification cost. 4 Estimated cost of making the modification function with the upgraded software equals is greater than 76% of the original estimated modification cost.
C – Custom Report/Inquiry Required	<p>The software (ERP or Third party package) supports the data elements necessary for the report/inquiry, but a custom report/inquiry would need to be developed to meet the requirement.</p> <p>A brief explanation is required to support any proposed modification; explanations should be provided in the "Comments" section of the matrix.</p> <p>The "Cost to Modify" section must be completed for each proposed modification (including design, coding, testing, installation, and all other costs associated with the modification).</p> <p>The "Hours to Modify" section must be completed for each proposed modification (including design, coding, testing, and installation).</p> <p>An assessment of the impact of the modifications on future system upgrades must be provided in the "Upgrade Impact" section. Acceptable values are:</p> <ul style="list-style-type: none"> 0 No impact on future upgrades 1 Estimated cost of making the modification function with the upgraded software equals approximately 25% or less of the original estimated

	<p>modification cost.</p> <p>2 Estimated cost of making the modification function with the upgraded software equals approximately greater than 25% and less than 50% of the original estimated modification cost.</p> <p>3 Estimated cost of making the modification function with the upgraded software equals approximately greater than 51% and less than 75% of the original estimated modification cost.</p> <p>5 Estimated cost of making the modification function with the upgraded software equals is greater than 76% of the original estimated modification cost.</p>
N – Cannot Meet Requirement	The desired feature or component is not available as standard functionality or through modification/enhancement. The requirement would most likely need to be met by a process workaround or by interfacing an existing legacy application.
T – Third Party	The desired feature or component is not available as standard functionality of the ERP system but is a standard feature of the third-party solution. The third-party software, which is fully integrated with the ERP system, provides the requested functionality without screen, code, or design changes. The proposed third-party product can satisfy the specification <u>"out-of-the-box"</u> without any modification to the standard baseline software offering. Only use "T" if the software fully meets the requirement.

D.5.4.1 Notes

Respondents should not be tempted to answer "S" to all questions to ensure higher compliance; the purpose of the functional and technical requirements matrices are to determine the degree to which ERP software, **in general**, will meet the State's business needs.

Respondents shall use one code only per requirement. Any requirement that is answered in any other way will be treated as a negative/non-response. Respondents may create their own separate spreadsheets for the respective sections to provide lengthier comments on particular requirements. All requirement responses for this section shall be submitted on read-only CD-ROM in Microsoft Excel™ 97, or higher, software format.

D.5.5 Estimated Costs Schedule

The purpose of the Estimated Costs Schedule is to assist the State in determining the estimated costs for acquiring and implementing a new statewide ERP system, as well as the estimated costs associated with maintaining (including upgrading) the software over ten (10) year period.

Respondents must complete and submit an electronic version of the spreadsheet in Appendix C and return it with their response on a read-only CD-ROM. Respondents should develop their cost estimates using the categories identified in the example Estimated Costs Schedule template found in Appendix C, with the costs detailed by state fiscal year (July 1 through June 30). The Estimated Costs Schedule shall be all-inclusive and shall encompass all costs required to start, implement, and maintain the solution for a period of ten (10) years. In responding to this section of the RFI, respondents should document all key

estimating assumptions and metrics used to derive the items in the requested spreadsheets. This information should be referenced to the "**Ref**" number on the schedules. A soft copy of the spreadsheet can be downloaded at www.state.tn.us/finance/oir/erp/index.html.

All costs should be allocated across the functional areas in accordance with the Estimated Costs Schedule template without exception. These functional areas include:

- Financial Management (includes general ledger, budgetary control, accounts payable, accounts receivable, cash management, grant and project accounting, cost allocation, travel, and asset management);
- Budget Development (includes performance-based budgeting);
- Procurement (includes e-Procurement);
- Inventory;
- Human Resources (includes personnel administration, position control, applicant tracking, training, compensation, time reporting, employee leave accounting, and employee self-service);
- Payroll Administration;
- Benefits Administration (includes medical insurance, life/accident insurance, dental insurance, flexible spending accounts, disability insurance, long term care, savings bonds, and employee assistance program); and
- Fleet Management.

D.6 High-Level Staffing Schedule

Respondents must complete and submit two electronic versions of the spreadsheet depicted in Appendix D and return it with their response on a read-only CD-ROM - one for respondent implementation resources and one for staff to be provided by the State of Tennessee (i.e., two separate spreadsheets). Be sure to clearly indicate which spreadsheet pertains to which group. Enter the average number of hours by functional area for each month during the development and implementation phase, and by quarter after the implementation activities are complete. The Respondent Staffing Schedule should support the Estimated Costs Schedule. A soft copy of the spreadsheet can be downloaded at www.state.tn.us/finance/oir/erp/index.html.

D.6.1 Assumptions for Cost Estimations

The Estimated Costs Schedule and High-Level Staffing Plan should be based on the following assumptions:

D.6.1.1 Scope Functionality

The scope of the new ERP system must address the following functionality:

Financial Management
• General Ledger / Budget Control
• Accounts Payable / Travel
• Accounts Receivable / Cash Receipts / Cash Management
• Budget Development (including Performance-Based Budgeting)
• Cost Accounting / Allocation
• Project and Grant Accounting
Purchasing
Inventory
Asset Management
Payroll
Human Resources
• Employee Self-Service
• Personnel Administration
• Position Control
• Recruiting and Applicant Tracking
• Training and Employee Development
• Compensation
• Timekeeping
• Employee Leave Accounting
• Benefits Administration (insurance only)

Retirement functionality is considered out-of-scope; the costs of software and implementation services associated with retirement business processes should not be included in the response.

D.6.1.2 Purchasing Scope

As documented in the Functional Requirements Matrix, the Purchasing scope includes eProcurement (e.g., catalog procurement, eRFx, reverse auctions).

D.6.1.3 Insurance Scope

In addition to managing the state-sponsored benefit plans for state employees, the Division of Insurance Administration also performs these same services for:

- Higher Education and the Board of Regents;
- Local Education (125 school districts); and
- Local Government (cities, counties and quasi-government entities).

There are approximately 380,000 total participants in the insurance program.

D.6.1.4 Fleet Management Scope

It should be assumed that Fleet Management functionality will be implemented at the Department of Transportation and the Department of Safety only.

D.6.1.5 Higher Education Involvement

Other than for the administration of their insurance benefits, Higher Education is not included in the scope of this study.

D.6.1.6 Software License Basis

The software cost should be based on a site or enterprise license.

D.6.1.7 Staffing Resource Allocation

Respondents should assume project work effort to be allocated as follows:

- 60% State resources
- 40% Respondent (contract) resources

D.6.1.8 Implementation Approach

For cost estimating purposes, respondents should assume that ERP functionality will be implemented using a “phased-in” approach as follows:

- **Phase 1**
Human Resources, Payroll Administration, and Benefits Administration functionality will be implemented at all state agencies over a period not to exceed twenty-four (24) months. Administration of insurance benefits will be implemented at this time for Higher Education and the Board of Regents, Local Education, and Local Government.
- **Phase 2**
Financial Management, Budget Development, and Inventory functionality will be implemented for all agencies except the Department of Transportation (TDOT) after Phase 1 is completed, over a period not to exceed eighteen (18) months. Procurement functionality, including eProcurement, will be implemented for TDOT.
- **Phase 3**
All remaining functionality (Financial Management, Budget Development, and Inventory) will be implemented for TDOT over a period not to exceed eighteen (18) months. Fleet Management functionality will be implemented at TDOT and the Department of Safety during this phase.

This phased-in approach is provided to ensure consistency in estimating costs only; **no decisions have been made by State leadership to define the implementation approach or the TDOT’s participation in the project.**

D.6.1.9 Post-Implementation Support

Based on the “phase-in” approach stated above, respondents should provide estimated costs of six (6) months of post-implementation support.

D.6.1.10 Exclude Interfaces and Conversion Costs

Respondents should not include estimated costs or staffing for developing interfaces or automated conversion processes. The State will apply estimates for these work activities.

D.6.1.11 Space for Project Team

Respondents should assume that the State will provide the following for the project team: work space, phones, LAN/WAN connectivity, network printers and personal computers.

D.6.1.12 Software Upgrade Year for Estimates

Respondents should include estimated implementation costs associated with a software upgrade in Year 6.

D.6.1.13 State's Technology Platform

Detailed technical requirements are documented in the Technical Requirements Matrix in Appendix B. The State's Architectural Standards are found in Appendix E.

D.6.2 Answers to Essay Questions

Respondents should provide answers to the following questions in narrative format:

D.6.2.1 Address All Proposed Software and Tools

Respondents must clearly identify all software products being proposed to address the State's functional business requirements, as well as any "middleware" or "third-party tools" required for adequate software performance. Costs associated with these products should be itemized in a detailed sub-schedule that supports the Estimated Costs Schedule.

D.6.2.2 Cyber Security

Respondents should address recent efforts by their company to protect the application software from cyber security threats, loss of functionality to State employees, and remaining vulnerabilities that exist beyond your control.

D.6.2.3 Customer References

Respondents should provide the customer name, contact name, phone number and e-mail address of at least one (1) customer that meets the Minimum Qualifications identified in Section C.7. Multiple customers should be provided where possible. Respondents should provide contact information for at least one (1) qualifying customer.

D.6.2.4 Conversion & Interface Exclusion

As stated above, respondents should not include estimated costs or staffing for developing interfaces or automated conversion processes, as the State will apply cost estimates for these work activities. However, any metrics or estimating tools may be suggested to assist the State in estimating these costs.

D.6.2.5 Functionality Outside Respondent ERP Solution

Where third-party application software (possible examples – budget development, performance based budgeting, fleet management) is used, in this section please provide a high level description of the third-party software product, and elaborate on how the third-party software will be integrated/interfaced with the proposed ERP software. Additionally, please document any clients for which the third-party software has been implemented with the proposed ERP software. Provide contact information for a customer reference.

D.6.2.6 Department of Transportation Experience

Please describe how you would recommend integrating/interfacing the Department of Transportation into the ERP business model. Describe the challenges of including state transportation departments in a statewide ERP solution. Describe respondent's experience working with state transportation departments in a statewide ERP environment, including contact information for customer references.

D.6.2.7 Performance-Based Budgeting Experience

Please describe respondent's definition of performance based budgeting and experience in implementing performance-based budgeting, including contact information for customer

references. Describe the challenges of implementing performance-based budgeting as part of a statewide ERP solution.

D.6.2.8 Additional Functionality

Respondents are requested to describe additional administrative functionality (not specifically requested in the requirements attached to this RFI) offered as part of the ERP software suite (e.g., constituency relationship management). Such functionality should be described in sufficient detail that the State can determine its usefulness.

Appendix A

Functional Requirements Matrix

Functional Requirements Matrix

The following table shows the page numbering scheme for the Functional Requirements. For example, all Asset Management pages begin with the abbreviation "AM".

Page numbering Abbreviation	Module Name	Page Number
AM	Asset Management	AM1
AP	Accounts Payable	AP1
AS	Applicant Services	ASI
BA	Benefits Administration	BA1
BU	Budget Development	BU1
CA	Cost Accounting	CA1
CC	Classification Compensation	CC1
CM	Cash Management	CM1
EL	Employee Leave Accounting	EL1
ESS	Employee Self Service	ESS1
FM	Fleet Management	FM1
GL	General Ledger	GL1
GR	Grant Accounting	GR1
IN	Inventory	IN1
PA	Personnel Administration	PA1
PC	Position Control	PC1
PR	Project Accounting	PR1
PU	Purchasing	PU1
PY	Payroll	PY1
RV	Revenue (Accounts Receivable)	RV1
TL	Timekeeping	TL1
TR	Training	TR1

Appendix B

Technical Requirements Matrix

Appendix C

Estimated Costs Schedule

Estimated Cost Schedule

RFI #317.03-093

Cost Category	Ref	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Project Management	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Software Installation, Configuration & Process Re-engineering	2											
Financial Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Budget Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Procurement		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Inventory		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Payroll Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fleet Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Software Installation, Configuration & Process Re-engineering		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Workflow Configuration	3											
Financial Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Budget Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Procurement		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Inventory		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Payroll Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fleet Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Workflow Configuration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Custom Development	4											
Interfaces		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Software Modifications	5											
Financial Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Budget Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Procurement		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Inventory		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Payroll Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fleet Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Software Modification		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Report Development	6											
Financial Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Budget Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Procurement		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Inventory		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Payroll Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fleet Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Report Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Data Conversion / Loading	7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Change Management	8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Training & Documentation												
Financial Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Budget Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Procurement		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Inventory		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Payroll Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fleet Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Report Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Estimated Cost Schedule

RFI #317.03-093

Cost Category	Ref	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Application Software License	9											
Financial Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Budget Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Procurement		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Inventory		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Payroll Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fleet Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Report Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Maintenance	10											
Financial Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Budget Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Procurement		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Inventory		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Human Resources		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Payroll Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits Administration		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fleet Management		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Report Development		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
All Other (itemize in response)	11											
Total Cost		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Appendix D

High-Level Staffing Schedule

High-Level Staffing Schedule

RFI #317.03-093

Staffing Category	Ref	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Project Management	1	0	0	0	0	0	0	0	0	0	0	0
Software Installation, Configuration & Process Re-engineering	2											
Financial Management		0	0	0	0	0	0	0	0	0	0	0
Budget Development		0	0	0	0	0	0	0	0	0	0	0
Procurement		0	0	0	0	0	0	0	0	0	0	0
Inventory		0	0	0	0	0	0	0	0	0	0	0
Human Resources		0	0	0	0	0	0	0	0	0	0	0
Payroll Administration		0	0	0	0	0	0	0	0	0	0	0
Benefits Administration		0	0	0	0	0	0	0	0	0	0	0
Fleet Management		0	0	0	0	0	0	0	0	0	0	0
Total Software Installation, Configuration & Process Re-engineering		-	-	-	-	-	-	-	-	-	-	-
Workflow Configuration	3											
Financial Management		0	0	0	0	0	0	0	0	0	0	0
Budget Development		0	0	0	0	0	0	0	0	0	0	0
Procurement		0	0	0	0	0	0	0	0	0	0	0
Inventory		0	0	0	0	0	0	0	0	0	0	0
Human Resources		0	0	0	0	0	0	0	0	0	0	0
Payroll Administration		0	0	0	0	0	0	0	0	0	0	0
Benefits Administration		0	0	0	0	0	0	0	0	0	0	0
Fleet Management		0	0	0	0	0	0	0	0	0	0	0
Total Workflow Configuration		-	-	-	-	-	-	-	-	-	-	-
Custom Development	4											
Interfaces												
Software Modifications	5											
Financial Management		0	0	0	0	0	0	0	0	0	0	0
Budget Development		0	0	0	0	0	0	0	0	0	0	0
Procurement		0	0	0	0	0	0	0	0	0	0	0
Inventory		0	0	0	0	0	0	0	0	0	0	0
Human Resources		0	0	0	0	0	0	0	0	0	0	0
Payroll Administration		0	0	0	0	0	0	0	0	0	0	0
Benefits Administration		0	0	0	0	0	0	0	0	0	0	0
Fleet Management		0	0	0	0	0	0	0	0	0	0	0
Total Software Modifications		-	-	-	-	-	-	-	-	-	-	-
Report Development	6											
Financial Management		0	0	0	0	0	0	0	0	0	0	0
Budget Development		0	0	0	0	0	0	0	0	0	0	0
Procurement		0	0	0	0	0	0	0	0	0	0	0
Inventory		0	0	0	0	0	0	0	0	0	0	0
Human Resources		0	0	0	0	0	0	0	0	0	0	0
Payroll Administration		0	0	0	0	0	0	0	0	0	0	0
Benefits Administration		0	0	0	0	0	0	0	0	0	0	0
Fleet Management		0	0	0	0	0	0	0	0	0	0	0
Total Report Development		-	-	-	-	-	-	-	-	-	-	-
Data Conversion / Loading												
Change Management	7											
Training & Doc.	8											
Financial Management		0	0	0	0	0	0	0	0	0	0	0
Budget Development		0	0	0	0	0	0	0	0	0	0	0
Procurement		0	0	0	0	0	0	0	0	0	0	0
Inventory		0	0	0	0	0	0	0	0	0	0	0
Human Resources		0	0	0	0	0	0	0	0	0	0	0
Payroll Administration		0	0	0	0	0	0	0	0	0	0	0
Benefits Administration		0	0	0	0	0	0	0	0	0	0	0
Fleet Management		0	0	0	0	0	0	0	0	0	0	0
Total Report Development		-	-	-	-	-	-	-	-	-	-	-
All Other (itemize in response)	9	0	0	0	0	0	0	0	0	0	0	0
Total Number of Staff		-	-	-	-	-	-	-	-	-	-	-

Appendix E

State of Tennessee Information Resources Architecture



State of Tennessee Information Resources Architecture

About the Technical Architecture

The Office for Information Resources (OIR) is responsible for establishing the State's Information Technology infrastructure; services and solutions; facilitation of information sharing; and aligning IT with the business needs of the State of Tennessee. An Information Technology Policy (Policy 6.00 Architecture) was developed by the Information Systems Council to establish standards and guidelines for the management and use of information systems in the State. The Tennessee Information Resources Architecture resulted from the implementation of this policy.

The state information resources architecture, developed using the NASCIO Enterprise Architecture Development Took-Kit, will evolve over time. The architecture documents are available on the OIR web site at <http://www.state.tn.us/finance/oir/arch/arch.htm>. The Tennessee Information Resources Architecture defines an infrastructure, as well as, the underlying policies and standards to support the IT needs of state government.

The architecture is defined as an interrelated set of nine architectural categories intended to guide IT activities in order to support the State's business strategies and information requirements. An architectural category is defined as a group of related technologies, usually organized around common IT infrastructure components or information management functions. These activities include the planning, design, selection, construction, deployment support and management of information technologies. The architecture defines not only the current environment, but may also contain directional statements and components. The objective of the state information resources architecture is to provide a foundation that enables information sharing, data integration and network interoperability and security. This foundation is the basis for effective and efficient delivery of services to the citizens of Tennessee.

Architecture Categories

Architectural Category	Description	Sub-Categories
Application	The Application Architecture identifies development criteria and techniques associated with applications.	Application Development Application Server Application Change Management Output Management Application Integration
Collaboration	The Collaboration Architecture identifies standards and components that facilitate the interaction of the workforce and promote group productivity.	Imaging Document Management Workflow Directory Services Email Collaboration Tools
Data	The Data Architecture deals with the storage, maintenance, and access of electronic data within the State environment. Data types that must be addressed are alphanumeric, image, and multimedia. Objects, as a data type, may be addressed in a future version of this document.	Data Storage Data Maintenance Data Access
Information	The Information Architecture identifies development areas requiring significant multi-agency coordination in the context of enterprise data and resource management. Addressed are enterprise planning and policies, data development, data maintenance, application development, data distribution, and organizational/personnel structure.	Data Warehousing Geographic Information Systems
Network	The Network Architecture supports the movement of electronic information, encompassing voice, data, and video. Components of the video, voice, and data infrastructures, and services and protocols to support the infrastructure are defined.	WAN LAN Voice SNA PTP Wireless Video and Cabling
Platform	The Platform Architecture identifies technology hardware platforms and the related operating systems to support the current and future business requirements.	Operating Systems Hardware Host Communications
Security	The Security Architecture provides for integrating security services, mechanisms, objects and management functions, across multiple hardware and software platforms and networks.	Security Mechanisms Security Services
Systems Management	The Systems Management Architecture defines the framework for efficient and effective management of the state's information processing environment in order to support and enhance the productivity of its automated business systems.	Storage Backup/Retrieval Software Management Monitoring Help Desk Online Access Training
Web	The Web Architecture describes how the State of Tennessee is structured to support web or browser-based activity.	Web Access Web Application Server Web Application Development Web Publishing

Application Architecture

Vision

Application Architecture identifies development criteria and techniques associated with applications. For maximum return on investment, application architecture enables:

- ease of integration of applications and application services;
- efficient reuse of existing application assets;
- faster deployment of new applications;
- responsive to changing business needs; and,
- agency interoperability.

Definition

The Application Architecture includes the languages, tools and utilities used to design, build, deploy, operate and maintain the State's applications.

Principles

- Develop applications in a consistent and orderly way, which includes the products, environments and processes.
- Avoid sudden, unplanned strains on current infrastructure capacities.
- Employ commonly used and proven technology for tools and practices in lieu of cutting-edge or unproven tools and practices.
- Manage development and maintenance of applications with consistent tools.
- Reuse at every opportunity and establish an environment that supports statewide reusability.
- Develop with consideration of ease of maintenance.
- Develop well; utilizing lessons learned, best practices, standards, and procedures.
- Maintain applications under a change management process.
- Buy versus re-invent.
- Employ a level of consistency in user interface.
- Support cross-agency sharing of development and maintenance staff.

Policies

- Information Technology Policies 4.00 Information Systems Design & Programming and 5.00 Information Systems Management & Application Development.

Industry Standards

- The State's Application Architecture products and practices follow standards administered and coordinated by the American Standard Code for Information Interchange (ASCII) and the American National Standards Institute (ANSI) organizations.

Sub-Categories

Application Development (non-web)

The Application Development sub-category identifies technology standards for how applications are designed, documented and maintained. This sub-category in cooperation with the Collaboration Architecture, provide criteria, approved methodologies and technologies that optimize the use and reuse of application components.

Product Categories

- Languages
- Tools & Utilities

Application Architecture

Application Server

Application Server architecture involves applications designed and deployed where the user interface logic and business logic have been separated (into a n-tier architecture). The client computer is responsible for processing the user interface. The server or servers are responsible for processing the basic database operations and business logic. By moving the business logic to the application server, network traffic is reduced.

-Tier Architecture:

Applications may be commonly referred to as single-tier (monolithic), 2-tier (client-server), 3-tier (n-tier) and (multi-tier) applications to indicate the number of logical separations into which they have been designed and deployed. From these terms come three commonly used application designations:

Single-tier architecture (a.k.a. monolithic): All processing is performed on a single computer.

2-tier architecture (a.k.a. client-server): Basic database operations are performed by one computer (database server), while everything else (user interface, application logic, and calculations) is performed on the user's computer.

3-tier architecture (a.k.a. n-tier, multi-tier, and client-server): The user interface logic and the business logic have been logically and/or physically separated with the business logic further separated into two or more logically related homogeneous partitions. The term 3-tier is often used to label the application's architecture even though more than 3 logical partitions exist for that application. Most 3-tier applications within the State are web applications.

Product Categories

● Application Server

Application Change Management

Application Change Management is the process of identifying, assessing and processing changes and customizations to applications. Additionally, it identifies and controls objects as they evolve over time, maintains a history of the changes as they evolve, and allows concurrent development work without interference from competing development teams or team members.

Product Categories

● Application Change Management

Output Management

Output Management involves control of the management, delivery and preservation of system produced information for such items as documents, reports and images.

Product Categories

● Output Management

Application Integration

Application Integration deals with the methods and mechanisms that facilitate the interoperation between independently developed application systems. This interoperation ranges from simply invoking processes in one application from another application to the sharing of sub-process components and data structures.

Product Categories

● Process Management

Collaboration Architecture

Vision

The Collaboration Architecture enables the creation, sharing, and leverage of accumulated information and knowledge across the spectrum of government. Collaboration technologies provide the means for people-to-people communication and collaborative work. Collaboration technologies are supported by directory services which provide infrastructure repositories for identity management, access control, resource identification and location, and management of relationships between named resources in the State's network.

Definition

To collaborate literally means co-working or "working together." A more precise definition of collaboration is the process of working together toward a common purpose or goal in which the participants are committed and interdependent, with individual and collective accountability for the results of the collaboration, and each of the participants shares a common benefit. Collaboration should accomplish the following:

- Increase efficiencies
- Streamline business processes
- Provide a more cost effective service delivery
- Enhance organizational intelligence
- Develop stronger relationships with key stakeholders – e.g., employees, vendors, the business community, other levels of government and the public.

Principles

- A standardized set of basic collaboration services will be provided to all employees as required to meet business needs.
- Enterprise collaboration requires access to a robust set of integrated network infrastructure services.
- Provide administrative support for completing daily business functions (ex. Word processing, spreadsheets, calendars, project management and scheduling, desktop publishing, etc.)
- Evolve from a paper-based organization to a digitally based organization.
- Collaborative systems and directories should be designed to be extensible, scaleable and portable across the enterprise platforms.
- Directory Services will support the use of the statewide network as the gateway to secure access to information and services.

Policies

- The Electronic Mail Acceptable Use Policy governs the usage of the email network and can be found at <http://www.state.tn.us/finance/oir/policy/aup/aupemail2.html>.

Legislation

State of Tennessee Uniform Electronic Transactions Act - Public Chapter 72 - 4/24/01. UETA is an electronic record and signature statute. UETA leaves existing law in place while providing that electronic records, signatures and contracts shall not be denied validity based solely on the medium. (Tennessee Code Annotated, Section 4-3-5501, effective May 10, 1994.)

Industry Standards

LDAP – Lightweight Directory Access Protocol

MIME – Multi-purpose Internet Mail Extensions

SMTP – Simple Mail Transport Protocol.

Project Management – Project Management Institute – A Guide to the Project Management Body of Knowledge (PMBOK) – see <http://www.pmi.org/standards/pmbok.htm>.

Collaboration Architecture

Sub-Categories

Imaging

Imaging is the electronic capture, storage, management, communication and retrieval of documents that have been converted from paper to digitized form. Imaging technology allows these documents to be displayed, annotated and distributed throughout the organization electronically, and to be stored and retrieved from a variety of storage media. Imaging systems can be categorized as imaging-enable traditional applications or multi-user integrated systems.

Product Categories

- Imaging
- Automated Data Capture

Document Management

Document Management consists of services for organizing, managing, and routing electronic documents. It includes the ability to store, locate and retrieve information throughout a document's life cycle. This includes from the time a document is created to the time it is archived to an offline storage media.

Product Categories

- Document Management

Workflow

Workflow enables electronic routing and control of information as it flows through an organization's business processing activities

Product Categories

- Workflow

Directory Services

Directories are used to store, organize and retrieve information for a variety of functions, such as e-mail, resource definitions for network operating systems (NOSs), identity, authentication and authorization or access control.

Product Categories

- Directory Services

Electronic Mail

Electronic Mail is the transmission of documents, notes and messages across a network. Enables the user to compose messages or notes and send documents in seconds to one or more recipients within the network.

Product Categories

- Electronic Mail

Collaboration Tools

Collaboration Tools provide the capability to complete daily business functions. Some of these tools are considered to be office automation tools and the others group collaboration tools. The tools include but are not limited to, the following: Word Processing, Spreadsheets, Presentation Packages, Business Graphics, Project Management and Scheduling, Desktop Publishing.

Product Categories

- Desktop Publishing
- Spreadsheet
- Word Processing
- List Management Software
- Project Management

Data Architecture

Vision

The Data Architecture will strive to maximize the quality, availability, and sharing of data.

Definition

The Data Architecture deals with the storage, maintenance, and access of electronic data within the State environment. The data types that must be addressed are alphanumeric, image, and multimedia.

Principles

- Data will be managed as a critical and valuable State resource.
- Adherence to State standard tools and techniques will maximize data sharing and leverage support staff resources.

Policies

- Information Technology Policies 1.00 Data Security and 10.00 Data Resource Management.

Industry Standards

- Relational database management systems (RDBMS) have become the IT industry's primary storage mechanism for enterprise or critical data. The State supports this direction and selects products with a wide base of support and user experience.
- Structured Query Language (SQL) is the industry standard for accessing relational databases.
- Extensible Markup Language (XML) is an industry standard for data exchange.

Sub-Categories

Data Storage

Data Storage deals with the design, implementation, and maintenance of the database objects and performance. Databases are the best mechanism for the storage of data considered to be critical to the operation of State government because of the ability to manage the access to and recovery of the data.

Product Categories

- Database Management System (DBMS)
- Database Change Management
- Database Monitoring
- Database Design

Data Maintenance

Data Maintenance deals with activities to ensure the quality and availability of the stored data.

Product Categories

- Data Availability (Backup / Recovery)
- Data Movement (Archive / Migration / Replication / File Transfer)
- Data Quality (Cleansing / Transformation)

Data Access

Data Access deals with the ways in which data can be requested for various purposes, particularly outside of operational applications, and the ways to support security requirements.

Product Categories

- Query / Reporting
- Data Analysis
- Data Applications
- Database Middleware
- Data Security

Information Architecture

Vision

The Information Architecture provides a conceptual model, policy environment, and IT infrastructure for multi-agency / enterprise IT projects that enhance information sharing.

Definition

The Information Architecture identifies subcategory development areas requiring significant multi-agency coordination in the context of enterprise data and resource management.

Principles

- Data assets involved in enterprise projects must strive to meet the functional requirements for all participating agencies.
- Enterprise-wide planning requires leadership and commitment; development of agency-specific supporting plans is essential to information sharing across participating agencies.
- The physical infrastructure must be economical, scalable, and responsive.
- Personnel roles and responsibilities at the agency level will clearly differentiate management personnel and application users.
- Enterprise IT project development provides an open-interface to opportunity.
- Data distribution and access policies need to be consistent across the enterprise.

Policies

- Data Warehouse Architecture
- Spatial Data Architecture (SDA)

Sub-Categories

Data Warehousing

The State Data Warehouse will consist of multiple servers running different operating systems and containing several databases. The vision of the Data Warehouse Architecture is to develop and implement policies and standards to ensure warehouses share a uniform architecture with conformed dimensions (or key fields) supporting integration into a coherent whole. The State Data Warehouse Architecture relies heavily on models, tools, metadata and methodology.

Product Categories

- Data Analysis
- Database Management System
- Repository
- Extract, Transform and Load

Geographic Information Systems (GIS)

The Spatial Data Architecture (SDA) addresses the support for enterprise geospatial data management and applications within the State of Tennessee. The SDA presents a foundation for the technical implementation of the Tennessee Base Mapping Program and the framework for developing coordinated geospatial systems planning at the agency level.

Product Categories

- Desktop Client
- Data Server
- PDA Client

Network Architecture

Vision

Effective networking and telecommunications are critical to the operation of State government, and Tennessee will strive to provide excellence in the movement of electronic information, encompassing voice, data, and video.

Definition

The Network Architecture includes components of the State's video, voice, and data infrastructures and provides detailed information on standards, products, services and/or protocols implemented to support those infrastructures.

Principles

- Provisioning of network services that are in the best interest of the State as a whole.
- Efficient, reliable management of all network devices, lines and protocols used in the infrastructure.
- Continual enhancements in network infrastructure design, development, deployment, and accountability.
- Central resources (management) balanced with distributed functionality to provide equity and value across the State.
- Expectations and services are driven by business needs and managed by objectives, economic value of access, service, performance and availability.
- Common capabilities are delivered to all users in a consistent manner. Location is not a determinant in network access.
- Operations are open network standards-based and rely heavily on industry standards and best practices.

Industry Standards

The State strives to base each of the sub-categories in the network architecture on standards and industry best practices. Network protocols, products, management tools, and/or service offerings are typically industry standard hardware and software components. Network design, deployment of methodologies to provision service offerings, and on-going management of services are also rooted in industry best practices. In addition to operations being standards-based, planning is a primary key to a reliable network infrastructure; from cabling, to design, to equipment installation, to on going network operations.

Sub-Categories

Cabling

A facility wiring plan is a long-term investment that should outlive the equipment it connects. EIA/TIA standards are followed because manufacturers are building their equipment to conform to these standards. Any time an infrastructure is upgraded or installed new, the work is done with the future, not just the present, in mind. It is impossible to ascertain what changes will come in technology, so care is taken to install wiring facilities that adhere to strict wiring standards that are applied statewide.

The complete State of Tennessee telecommunications wiring standards can be found in PDF format at the following URL: <http://www.state.tn.us/finance/oir/telecom/cabling.htm>

Product Categories

- WAN
- LAN
- Voice
- SNA
- Video

Network Architecture

Sub-Categories

Point-to-Point Wireless

While wireless communications are increasing in popularity, the industry is still considered to be dynamic and evolving. Industry standards are currently being developed and are incomplete. As of today, wireless systems are still typically dependent on a wired backbone. The State has implemented limited point-to-point wireless connections, and all deployments are based on industry standard wireless communication protocols.

Product Categories

- Wireless Protocol
- Antenna
- Wireless Transport

Data Networking (LAN, WAN, SNA)

Local Area Networks (LANs) support the needs of workgroups, agencies, or end sites; and the SNA and Wide Area Networks (WAN) support the cooperative and collaborative functions within the statewide enterprise. Varying business requirements necessitate using a variety of applications on the networks; however, the same need for variety does not exist within the network infrastructure. A uniform network architecture enables LANs within the WAN to inter-operate, while allowing a broad platform on which to run applications as needed. Such interoperability requires cooperation at all agency levels, and standards-based network components (e.g., wiring, hubs, servers, operating systems, and protocols), management practices, and service offerings. Data networking operations are rooted in a finite set of industry best practices:

- **Network Fault Tolerance** – Systems are designed to avoid single points of failure wherever possible.
- **Security** – All traffic will be logically secured with an enterprise-wide level of security. Additional network security will be provided for selected data and applications as determined by the data classification. Equipment rooms, server rooms, and wiring closets will be secured, to the extent possible, against unauthorized access.
- **Capacity Planning** – Sufficient time, personnel resources, and facilities will be applied to ensure that network capacity is available and is within the agreed service commitments.
- **Network Monitoring & Trouble Management** – Centralized network monitoring, help desk functions, and technical support will be maintained to ensure that on-going network operations, troubleshooting and capacity planning are available to meet the customer's changing business needs.

Product Categories WAN

- Router
- Carrier/Circuit
- Network Protocols
- Network Monitoring/Management

Product Categories LAN

- Hubs/Switches
- Adapters
- Network Protocols
- Monitoring
- File Access and Transfer Service

Product Categories SNA

- Backbone Transport
- Network Management
- Network Protocol

Network Architecture

Sub-Categories

Voice

Voice service for State agencies may consist of individual POTS (plain old telephone service) lines from a local exchange carrier (LEC), Centrex service, or a premise-based key system or private branch exchange (PBX) with a pool of lines or trunk facilities capable of carrying multiple simultaneous calls over each facility. State contracts for services and equipment are used to provide services to agencies statewide, depending upon their locale and specific business needs. The cost of services may vary by locale; however, provisioning of premise-based equipment is based on standard platforms and standard offerings of services regardless of locale.

Most of the following areas of advanced voice applications are also supported by State contracts that are centrally managed, and services are provided, based on the technologies currently available through those contracts.

- **Automated Attendant** – Systems that answer calls with a recorded message and allows calls to be routed to one or more destinations within the organization by pressing a button on their touchtone dial pad or speaking in response to a prompt.
- **Automatic Call Distribution (ACD)** – A system to handle incoming calls by routing them to a pool of staff (ACD agents). The system provides recordings for callers who are "in queue" awaiting the next available agent.
- **Interactive Voice Response (IVR)** – A system that interacts with databases to allow callers to receive and input data to a database. Callers may be prompted to enter digits via their touchtone dial pads to receive information that is "read" by the IVR unit to them or input information that can be read back to confirm what has just been entered.

Product Categories

- | | |
|--------------------------------|--------------------------|
| ● Commercial C/O Service | ● Business Lines |
| ● PBX Trunks | ● Backbone Transport |
| ● Premise Based System | ● Long Distance |
| ● VMS – Voice Messaging System | ● Call Center Management |

Video

Coder-decoder (CODEC) equipment currently used on the State video network are H.320 and H.323 standards-based to ensure compatibility with systems outside the statewide private video network and interoperability with the existing infrastructure.

The existing H.320 private dedicated video network is implemented using ISDN and T-1 services, with Primary Rate Interface (PRI) access to the public switched telephone network for off-network calls. The current bridge supports H.320; however, most end site CODECs support both H.320 and H.323 thereby facilitating the migration to video over IP.

Product Categories

- | | |
|----------------------------|-------------------|
| ● Circuit/Carrier | ● Video CODEC |
| ● Video Protocol | ● Document Camera |
| ● Telemedicine Peripherals | ● Video Switches |
| ● CSU/DSU | ● Video Bridge |
| ● Modems | |

Platform Architecture

Vision

The Platform Architecture will standardize configurations in order to secure the infrastructures, optimize total cost of ownership, reduce the cost of support staffs, and allow acquisitions to be made in the best interest of the State.

Definition

The Platform Architecture identifies technology hardware platforms and the related operating systems to support current and future business requirements.

Principles

- Operating systems must be designed, acquired, developed or enhanced such that data and processes can be shared and integrated across the enterprise.
- Hardware will be industry-proven, mainstream technologies. Priority will be given to products adhering to industry standards and open architecture.
- Host communications support must be industry-proven, mainstream technologies.

Policies

- Information Technology Policy 3.00 Ownership.

Sub-Categories

Operating Systems

Operating systems manage the hardware and software resources of the computer systems. Our operating systems must provide a stable, consistent way for applications to deal with the hardware.

Product Categories

- Application/Database Server Operating Systems
- File and Print Services

Hardware

Hardware defines the physical computer components that are included in the State's information technology environment.

Product Categories

- Hardware

Host Communications

Host communications define the techniques used to communicate between the multiple hardware platforms that interface with the State's information technology environment.

Product Categories

- Host Communications

Security Architecture

Vision

Security Architecture must provide for integrating security services and mechanisms across multiple hardware and software platforms and networks.

Definition

The architecture supports the strategy for providing end-to-end protection of applications and information within the organization. Compliance with all government regulations and standards related to information security is also supported.

Principles

- Infrastructure security services must be provided that will enable the State to conduct business electronically.
- Access to and transmission of data or resources should be secured, audited and monitored at a level consistent with their value and relative vulnerability.
- Any individual or service accessing sensitive data or resources should be identified.

Policies

- Information Technology Policies 1.00 Data Security, 8.00 Systems Dial-Up Access Security and 12.00 Open Access to Electronic Information apply to the Security Architecture.

Sub-Categories

Security Mechanisms

Security Mechanisms encompass administration, physical security, cryptography and hardware/software functions.

Product Categories

- Virus Protection
- Virtual Private Networks
- Firewalls
- Intrusion Detection

Security Services

Security Services encompasses authentication, access control, confidentiality, data integrity, non-repudiation, and audit services.

Product Categories

- Certificate Authority/Public Key Infrastructure
- Certificates
- Encryption
- System/Data Security

Systems Management Architecture

Vision

The Systems Management Architecture defines the framework for efficient and effective management of the State's information processing environment in order to support and enhance the productivity of its automated business systems.

Definition

Systems Management includes the monitoring and management of peripheral devices and processes that are necessary for the performance, reliability, and availability of production systems.

Principles

- Systems management tools shall support the monitoring and measuring of capacity, systems reliability, systems stability and accessibility.
- System components should include predictive capability and proactively alert in advance of failure.
- The capability to recover the production environment in whole or in part shall be part of the Systems Management Architecture.
- Distribution of software shall be accomplished in a structured manner.
- Problem tracking and control shall be done with managed techniques.

Policies

- Information Technology Policy 9.00 Disaster Recovery.

Sub-Categories

Storage

The Storage component of Systems Management encompasses allocation and administration of the data storage devices associated with production systems.

Product Categories

- Storage Management

Recovery

Recovery includes the capability to backup and retrieve the production systems.

Product Categories

- Backup/Retrieval

Software Management

Software Management deals with the distribution of software.

Product Categories

- Software Distribution

Monitoring

Monitoring deals with all aspects of performance tuning.

Product Categories

- Performance tuning

Help Desk

The Help Desk deals with recording, tracking, and documenting the resolutions of reported problems.

Product Categories

- Problem Control Management

Online Access

Online access deals with the remote access to the State's production systems.

Product Categories

- TP Monitors
- Internet Access

Web Architecture

Vision

The vision for Tennessee is to have all Internet services go through the portal and to provide an environment to support web applications.

Definition

The Web Architecture describes how the State of Tennessee is structured to support web (or browser-based) activity.

Web Servers are provided at the Data Center to support web applications and static web pages. Development of web applications or static web pages is done on workstations. Both a test and production environment are provided at the Data Center for both static web sites and web applications. However incremental testing can be done on a workstation web server, provided it is not open to the Internet, restricted to a developer, maintains a hardened operating system with latest patches applied, etc.

Web servers are located at the Data Center, to provide access to the Internet and Intranet. Web browsers are installed on employee desktops. A three-tiered architecture (web, application, and database server) is used as follows:

- Tier 1 – Browser - provides a Graphical User Interface (GUI).
- Tier 2 – Web Application Server - retrieves data from database and legacy applications; runs applications that process business logic; formats data and sends it to the browser.
- Tier 3 – Database - provides a repository of stored data.

Tennessee chose a one-stop, citizen-centric Internet portal as the entry point, to provide access to our government services to the public. Tennessee contracts with financial services vendors and a portal vendor, to provide online e-Government financial transaction services over the Internet.

Principles

- A secure environment for conducting business via web applications and Internet services shall be made available. The same shall be made available for state employees to conduct business with state employees or select business partners.
- The Web Architecture shall provide the infrastructure for web development.
- Solutions for supporting web activity shall use industry-proven technologies.
- The Tennessee Internet portal shall be designed based on customer's needs.

Policies

- The Governor's Web Publishing Policy is presented at <http://www.state.tn.us/guidelines/GWPP.html>.
- The State's Web Guidelines are presented at <http://www.state.tn.us/guidelines/>.
- The State's Portal Policy is presented at <http://www.state.tn.us/guidelines/tf.html> - portalpolicies.
- The State's Financial Transactions guidelines are presented at <http://www.state.tn.us/guidelines/tf.html>.
- The State's Internet Acceptable Use policy is presented at <http://www.state.tn.us/finance/oir/policy/aup/int-aup.htm>.

Industry Standards

The World Wide Web Consortium (W3C) develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential as a forum for information, commerce, communication, and collective understanding.

Web Architecture

Sub-Categories

Web Access

This category encompasses the products that give access to the Web.

Product Categories

- Web Browser
- Web Server

Application Server

An application server deals with a suite of software that forms the middle layer in a 3-tier, Web-based network. Its purpose is to provide a link between browser-based clients and back-end database or legacy applications.

Product Categories

- Application Server

Web Application Development

This category encompasses the products (hardware and software) that support web application development.

Product Categories

- Web Application Development Tools
- Web Graphical User Interface Development Tools

Web Publishing

This category deals with static web content pages, typically written in HTML, that are delivered using Internet technology and require no runtime packages other than web server software.

Product Categories

- Web Publishing

State of Tennessee Standard Products List

Architecture Sub-Category	Product Category	Emerging	Current	Twilight	Obsolete	Product	OS/390	Solaris	Netware	Windows	Desktop
Application Architecture											
Application Development (non-web)	Languages		X			COBOL MVS	X				
			X			Visual Studio				X	X
			X			Visual Basic					X
			X			Access					X
				X		FoxPro					X
				X		PowerBuilder					X
					X	Dbase					X
				X		ADF	X				
	Tools & Utilities			X		TELON	X				
				X		Cool:Gen	X				
						Oracle Developer Suite					
			X			Forms Developer		X		X	X
			X			Designer		X		X	X
			X			Reports Developer		X		X	X
			X			Discoverer		X		X	X
						Graphical User Interface					
			X			Jacada		X		X	X
						Postal Verification Certification					
			X			Finalist	X				
			X			Finalist (Cross Check)		X		X	
						Batch Reporting Language					
			X			Easytrieve Plus	X				
			X			SAS	X				
Application Server	Application Server		X			Oracle 9i Application Server		X		X	
Application Change Management	Application Change Management	X				Oracle Software Configuration Management		X		X	X
			X			Librarian Change Control Facility	X				
			X			PVCS Suite		X	X	X	X
			X			Visual SourceSafe				X	X
Output Management	Output Management		X			Microfiche	X				
			X			View Direct (formerly InfoPac)	X				
			X			Advanced Function Printing	X				
			X			Monarch					X
			X			Document Direct for the Internet †				X	
Application Integration	Process Management	X				Oracle Interconnect		X		X	X
		X				Oracle Workflow		X		X	X

† Web-based product

★ Web-enabled-product

Architecture Sub-Category	Product Category	Emerging	Current	Twilight	Obsolete	Product	OS/390	Solaris	Netware	Windows	Desktop
Collaboration Architecture											
Imaging	Imaging		X			Panagon Image Services		X		X	
			X			Panagon Content Services		X		X	
	Automated Data Capture		X			TeleForm			X	X	X
			X			Panagon Capture Pro		X		X	
		X			Panagon Capture Desktop		X		X	X	
Document Management	Document Management										
Workflow	Workflow		X			eProcess Services		X		X	
Directory Services	Directory Services		X			NDS Directory			X		
		X				Active Directory				X	
		X				Oracle Internet Directory		X		X	
Electronic Mail	Electronic Mail		X			GroupWise ★			X		X
Collaboration Tools	Desktop Publishing		X			PageMaker					X
	Spreadsheet		X			Excel					X
			X			Lotus 1-2-3					X
	Word Processing		X			Word					X
			X			WordPerfect					X
	List Management Software		X			LISTSERV		X		X	
	Project Management		X			State of TN IT Methodology	X	X	X	X	X
			X			Microsoft Project			X	X	X
		X			Project Workbench			X	X	X	
Data Architecture											
Data Storage	Database Management System		X			DB2 for OS/390	X				
			X			Oracle		X	X	X	X
			X			MS SQL/Server				X	
			X			IMS DB for OS/390	X				
				X		Informix		X			
				X		FoxPro					X
			X			Access					X
	Database Change Management		X			RC/Migrator (DB2)	X				
			X			RC/Update (DB2)	X				
			X			DSIMS (IMS)	X				
		X				Oracle Software Configuration Management		X		X	X
	Database Monitoring		X			The Monitor for DB2	X				
			X			Database Analyzer (DB2)	X				
			X			Savant (for Oracle)					X
			X			TMON/IMS	X				

† Web-based product

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Architecture Sub-Category	Product Category	Emerging	Current	Twilight	Obsolete	Product	OS/390	Solaris	Netware	Windows	Desktop
Data Architecture											
Data Storage (Cont.)	Database Design		X			ERWin					X
			X			Data Architect					X
			X			Warehouse Architect					X
		X				Oracle Designer					X
Data Maintenance	Data Availability		X			Various DB utilities					
	Data Movement		X			RC/Migrator (DB2)	X				
			X			RC/Update (DB2)	X				
			X			Move for DB2	X				
			X			XCOM	X				X
			X			FTP	X	X		X	X
			X			Connect: Direct	X				X
			X			IMS CDC	X				
			X			MVS/Expedite	X				
	Data Quality										
Data Access	Query / Reporting		X			BI/Query					X
			X			QMF	X				
			X			RC/Update	X				
				X		SQR		X			
			X			Easytrieve Plus	X				
			X			Monarch					X
					X	Culprit	X				
			X			SAS	X				
			X			Crystal Reports					X
			X			Crystal Enterprise Server				X	
			X			Oracle Reports					X
			X			Oracle Discoverer					X
			X			Fileaid/IMS	X				
			X			Datavantage	X				
	Data Analysis	X				Oracle Discoverer					X
						MicroStrategy ★					
			X			Intelligence Server				X	
			X			Web Server				X	
			X			Narrowcast Server				X	
	Data Applications		X			Desktop					X
		X				Oracle Software Configuration Management		X		X	X
			X			ArcInfo		X		X	X
			X			ArcView		X		X	X
	Database Middleware			X		Star/SQL				X	X
			X			DB2 Connect				X	X
			X			EDA/SQL	X				X
	Data Security		X			RC/Secure (DB2)	X				

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Architecture Sub-Category	Product/Protocol Category	Emerging	Current	Twilight	Obsolete	Product/Protocol	OS/390	Solaris	Netware	Windows	Desktop
Information Architecture											
Data Warehousing	Data Analysis	X				Oracle Discoverer					X
						MicroStrategy ★					
			X			Intelligence Server				X	
			X			Web Server				X	
			X			Narrowcast Server				X	
			X			Desktop					X
	Database Management System		X			DB2 For OS/390	X				
			X			Oracle		X	X	X	X
	Repository	X				Oracle Software Configuration Management		X		X	X
	Extract, Transform, and Load	X				Oracle Warehouse Builder		X			X
Geographic Information Systems (GIS)	Desktop Client		X			ArcInfo				X	X
			X			ArcView					X
	Data Server		X			ArcIMS		X		X	
	PDA Client	X				ArcPad					
Network Architecture											
WAN	Router		X			Cisco					
	Carrier/ Circuit		X			DS1					
			X			DS3, OC3					
			X			ISDN					
				X		SMDS/CDS					
		X				Frame Relay					
		X				ATM					
		X				DSL					
	Network Protocols		X			TCP/IP					
			X			IPX					
			X			OSPF					
			X			PPP					
	Network Monitoring/ Management		X			Cisco Works 2000		X			
			X			Remedy		X			
			X			MRTG		X			
			X			SNIPS		X			
			X			NAT					
			X			DHCP		X			
			X			DDNS		X			
LAN	Hubs / Switches		X			Nortel					
	Adapters		X			Ethernet					
				X		Token Ring					
	Network Protocols		X			TCP/IP					

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Architecture Sub-Category	Product/Protocol Category	Emerging	Current	Twilight	Obsolete	Product/Protocol	OS/390	Solaris	Netware	Windows	Desktop
Network Architecture											
LAN (Cont.)	Monitoring		X			Network Associates Sniffer Suite					
	File Access and Transfer Service		X			FTP	X	X		X	X
			X			XCOM	X				X
			X			Attachmate Extra					X
Voice	Commercial C/O Service		X			Centrex					
	Business Lines		X			1FB					
	PBX Trunks		X			ISDN/PRI					
	Backbone Transport			X		Electronic Tandem Network (ETN)					
	Premise Based System		X			Comdial					
				X		Walker					
				X		Omega					
				X		NEC 2400 Tadiran					
	VMS – Voice Messaging System		X			Memory Call					
	Call Center Management		X			Call Management System					
SNA	Backbone Transport		X			T1					
			X			T3 Channels					
			X			DACS Switches					
	Network Management			X		Paradyne 6800					
						Network Management System					
	Network Protocol			X		SNA-SDLC					
Point-to-Point Wireless	Wireless Protocol	X				802.11A					
		X				802.11G					
		X				802.11H					
		X				802.1X					
	Wireless Transport		X			802.11B					
		X				5.8 GHz					
Video	Circuit/Carrier		X			2.4 GHz					
			X			T-1					
			X			ISDN/PRI					
	Video CODEC		X			ISDN/BRI					
			X			Polycom					
	Video Protocol		X			H.320					
			X			H.323					
	Document Camera		X								
			X			Elmo					
	Telemedicine Peripherals		X			Cannon					
	Video Switches		X			AMD					
						Initia					

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Architecture Sub-Category	Product/Protocol Category	Emerging	Current	Twilight	Obsolete	Product/Protocol	OS/390	Solaris	Netware	Windows	Desktop
Network Architecture											
Video (Cont.)	CSU/DSU		X			Paradyne					
			X			Adtran					
	Video Bridge		X			Vtel					
			X			Video Accord					
	Modems		X			MultiTech					
Cabling	WAN		X			Fiber Optic 62.5/125 Multimode					
		X				Fiber Optic Single Mode					
	LAN			X		Cat 5					
			X			Cat 6, Fiber Optic 62.5/125 Multimode					
		X				Cat 6e, Fiber Optic 50/125 Multimode					
	Voice				X	Cat 3					
				X		Cat 5					
			X			Cat 6					
		X				Cat 6e					
	SNA				X	RG-62, Coaxial Cable					
			X			Cat 6, 25-pin EIA					
		X				Cat 6e					
	Video		X			RG-6 Coax, RG-11 Coax					
			X			Cat 6					
		X				Cat 6e					
Platform Architecture											
Operating Systems	Application/ Database Server Operating System		X			OS/390	X				
			X			Solaris		X			
			X			Netware			X		
				X		Windows NT Server				X	
			X			Windows 2000 Server				X	
		X				Windows XP Server				X	
				X		Windows 95					X
				X		Windows NT Workstation					X
			X			Windows 2000 Workstation					X
			X			Windows XP Professional					X
Operating Systems (Cont.)	File and Print Services		X			Netware			X		
Hardware	Hardware		X			IBM (OS/390) compatible	X				
			X			Solaris Compatible		X			
			X			Intel			X	X	X

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Architecture Sub-Category	Product Category	Emerging	Current	Twilight	Obsolete	Product	OS/390	Solaris	Netware	Windows	Desktop
Platform Architecture											
Host Communications	Host Communications		X			ACF/VTAM (telecommunications access)	X				
			X			ACF/NCP (Network Control Pgm)	X				
			X			3270	X				X
			X			RJE	X	X			X
			X			Host on Demand (HOD) †	X			X	X
			X			Personal Communications					X
			X			XCOM					X
			X			Attachmate Extra					X
			X			TCP/IP	X	X	X	X	X
					X	NSA (RJE)					X
Security Architecture											
Security Mechanisms	Virus Protection		X			Norton Antivirus			X	X	X
	VPN		X			Microsoft PPTP				X	X
			X			Checkpoint VPN-1		X			
			X			Cisco PIX		X			
	Firewall		X			Checkpoint Firewall-1		X			
			X			Cisco PIX		X			
	Intrusion Detection		X			RealSecure				X	
Security Services	Certificate Authority/ Public Key Infrastructure		X			Entrust		X		X	X
	Certificates		X			Microsoft Certificate Server				X	
	Encryption		X			RSA					
			X			Kerberos					
	System/Data Security		X			RACF Security	X				
			X			UNIX Operating System Security		X			
			X			Netware Directory Services			X		X
		X				Active Directory				X	X
		X				Oracle Internet Directory		X		X	
			X			Screen Saver			X	X	X
			X			Power-on Passwords					X
			X			Windows Logon				X	X

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Architecture Sub-Category	Product Category	Emerging	Current	Twilight	Obsolete	Product	OS/390	Solaris	Netware	Windows	Desktop
Systems Management Architecture											
Storage	Storage Management		X			SAMS/Allocate	X				
			X			SAMS/Vantage	X				
			X			SMS	X				
			X			CA1	X				
			X			Veritas Net Backup		X			
Backup/Retrieval	Backup/Retrieval		X			FDR	X				
			X			HSM	X				
			X			ArcServe			X	X	
			X			Veritas Net Backup		X			
Software Management	Software Distribution		X			ZEN Works			X		X
Monitoring	Performance Tuning		X			Netview	X				
			X			OpenView	X				
			X			Optivity		X			
			X			Insite Manager			X	X	
			X			TMON/IMS	X				
			X			TMON/MVS	X				
			X			TMON/CICS	X				
			X			TMON/DB2	X				
Help Desk	Problem Control Management		X			Remedy Action Request System		X			
Online Access	TP Monitors		X			Roscoe	X				
			X			CICS	X				
			X			IMS/DC	X				
			X			TSO	X				
	Internet Access		X			Host On Demand †	X			X	X
Training	Computer Based Training			X		Phoenix	X				

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Architecture Sub-Category	Product Category	Emerging	Current	Twilight	Obsolete	Product	OS/390	Solaris	Netware	Windows	Desktop
Web Architecture											
Web Access	Web Browser		X			Netscape					X
			X			Internet Explorer					X
	Web Server		X			Oracle Apache		X			
				X		Netscape		X			
			X			Microsoft Internet Information Server				X	
Application Server	Application Server				X	NetDynamics		X		X	
			X			Microsoft .NET/Com+				X	
			X			Oracle 9i Application Server		X			
Web Application Development	Web Application Development Tools				X	NetDynamics		X		X	
			X			Visual Studio				X	X
			X			Oracle Internet Developer Suite		X		X	X
	Web Graphical User Interface Development Tools		X			Jacada		X		X	X
			X			Oracle Internet Developer Suite		X		X	X
Web Publishing	Web Publishing		X			Front Page					X
			X			Adobe Acrobat					X
			X			Dreamweaver					X
			X			Flash					X
			X			Fireworks					X

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ACRONYMS

ACF/NCP

Advanced Communication Function/Network Control Program

ACF/VTAM

Advanced Communication Function/Virtual Telecommunication Access Method

ATM

Asynchronous Transfer Mode

CICS

Customer Information Control System

DDNS

Dynamic Domain Name Service

DHCP

Dynamic Host Control Protocol

DLSw

Data-Link Switching

DSL

Digital Subscriber Lines

FDR

Failures-Divergence Refinement

FTP

File Transfer Protocol

HSM

Hierarchical Storage Management

IPX

Internetwork Packet Exchange

ISDN

Integrated Services Digital Network

ISDN/BRI

Basic Rate Interface

ISDN/PRI

Primary Rate Interface

MRTG

Multi-Router Traffic Grapher

NAT

Network Address Translation

PPP

Point-to-Point Protocol

PPTP

Point-to-Point Tunneling Protocol

OSPF

Open Shortest Path First

QMF

Query Management Facility

RACF

Resource Access Control Facility

RJE

Remote Job Entry

SMDS

Switched Multimegabit Data Service

SMS

Systems Management Server

SNA/SDLC

Systems Network Architecture/Synchronous Data Link Control

SNIPS

System & Network Integrated Polling Software

SQR

Structured Query Report Writer

SQL

Structured Query Language

ACRONYMS

TCP	Transmission Control Protocol
TSO	Time Sharing Option
1FB	Single-line flat-rate business line

Appendix A

Architecture Outline (for each of the nine categories) is defined as follows:

Vision

A brief statement related to the Architecture perspective and need.

Definition

A statement that describes what the Architecture consists of.

Principles

A basic generalization that is accepted as true and that can be used as a basis for reasoning. Generally, the rule of thumb would be one principle per sub-category. In some instances, there may be more than one principle per sub-category.

Policies

A plan or course of action intended to influence and determine decisions, actions, and other matters. Acceptable Use Policies can be referenced within this section.

Legislation

Laws that have been enacted specifically related to the Architecture and Mandates and Executive Orders.

Industry Standards

A definition or format that has been approved by a recognized standards organization or is accepted as a de facto standard by the industry. This would only include industry standards that have been accepted by the State of Tennessee.

For each of the Sub-Categories:

Description

A statement that describes what the Architecture Sub-Category consists of.

Product Categories

The type of product(s) defined under each of the architecture sub-categories.

Products List

Consists of the State standard products within the Architecture, as well as, products that are currently being planned for implementation by the State. Each product is categorized as Emerging, Current, Twilight or Obsolete.

- **Emerging** – These products are being evaluated, tested or they are involved in proof of concept or pilot testing. Products listed in this category usually identify future candidates for standard acceptance.
- **Current** – These are products designated for development or acquisition, and for replacement of obsolete or twilight products.
- **Twilight** – These are products in which the State has an investment in or has used for deployment. These products are currently supported. However, new development should use current products rather than these product(s). Plans should be developed to move from twilight to current products.
- **Obsolete** – It is highly likely that these products are not supported by the vendor, but could still be in use within the State. Plans should be developed to rapidly phase out and replace them with current products. No development should be undertaken using these products.

Product List Legend Definitions

- † Web-based – Executes on the Web; can only be accessed through the Web.
- ★ Web-enabled – Has the ability to run on the Web and other platforms.

Appendix B

Architecture Ownership:

Emerging Technologies, Projects, and Applications:

- Application
- Collaboration
- Data
- Information
- Web

Operations and Infrastructure Support

- Network
- Platform
- Security
- Systems Management

Architecture Annual Assessment Review Process

1. Quality Assurance (QA) Responsibility The Quality Assurance Group is responsible for conducting the Architecture Annual Assessment Review Process.
2. OLT Responsibility – The Office for Information Resources (OIR) Leadership Team (OLT) is responsible for determining the acceptability of the Information Resources Architecture. Reviews should focus on factors such as:
 - Conformance with and support for Information Systems Council and OIR policies.
 - Support for State of Tennessee standards.
 - Ability to be implemented and complied with.
 - Supportive of the Information Resources Architecture.
3. The Architecture should be reviewed and updated for, but not limited to, the following reasons:
 - Standards have changed.
 - New technologies have been evaluated.
 - A product becomes obsolete.
 - Policy changes.
 - Strategic direction changes.
4. Internal reviews/assessments should occur for each of the architecture categories. Each architecture category should be reviewed by the appropriate owner(s). If there are overlapping groups of responsibility for an architecture, this should be coordinated between the organizational sections.
5. Once approval is obtained, the Architecture would be republished.